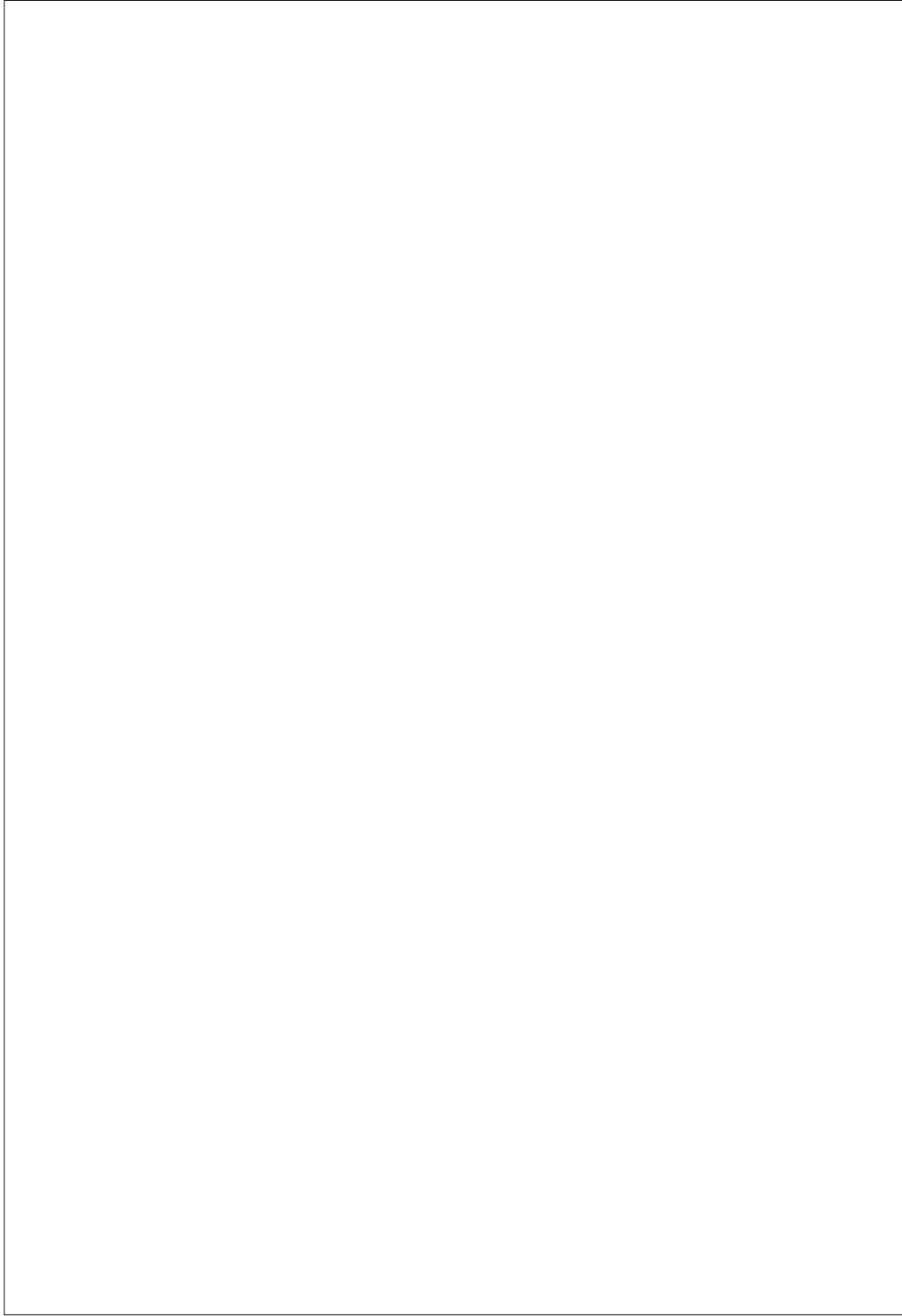


TOYS FROM TRASH

ARVIND GUPTA
ILLUSTRATIONS BY RESHMA BARVE





ARVIND GUPTA graduated from the Indian Institute of Technology, Kanpur (1975) with a degree in Electrical Engineering. He has written 15 books on science activities, translated 140 books into Hindi and presented 125 films on science activities on *Doordarshan*. His first book *Matchstick Models & Other Science Experiments* was translated into 12 Indian languages and sold over half a million copies. He has received several honours, including the inaugural *National Award for Science Popularization amongst Children* (1988), *Distinguished Alumnus Award of IIT, Kanpur* (2000), *Indira Gandhi Award for Science Popularization* (2008) and the *Third World Academy of Science Award* (2010) for making science interesting for children. Currently he works at IUCAA's Children's Science Centre, Pune, and shares his passion for books and toys through his popular website <http://arvindguptatoys.com>

RESHMA BARVE studied Commercial Arts at the Abhinav Kala Mahavidyalaya, Pune. She is a freelance artist and designer and has illustrated many children's books.

This book was developed under a grant from the
Navajibai Ratan Tata Trust.

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Illustrations Copyright: Reshma Barve



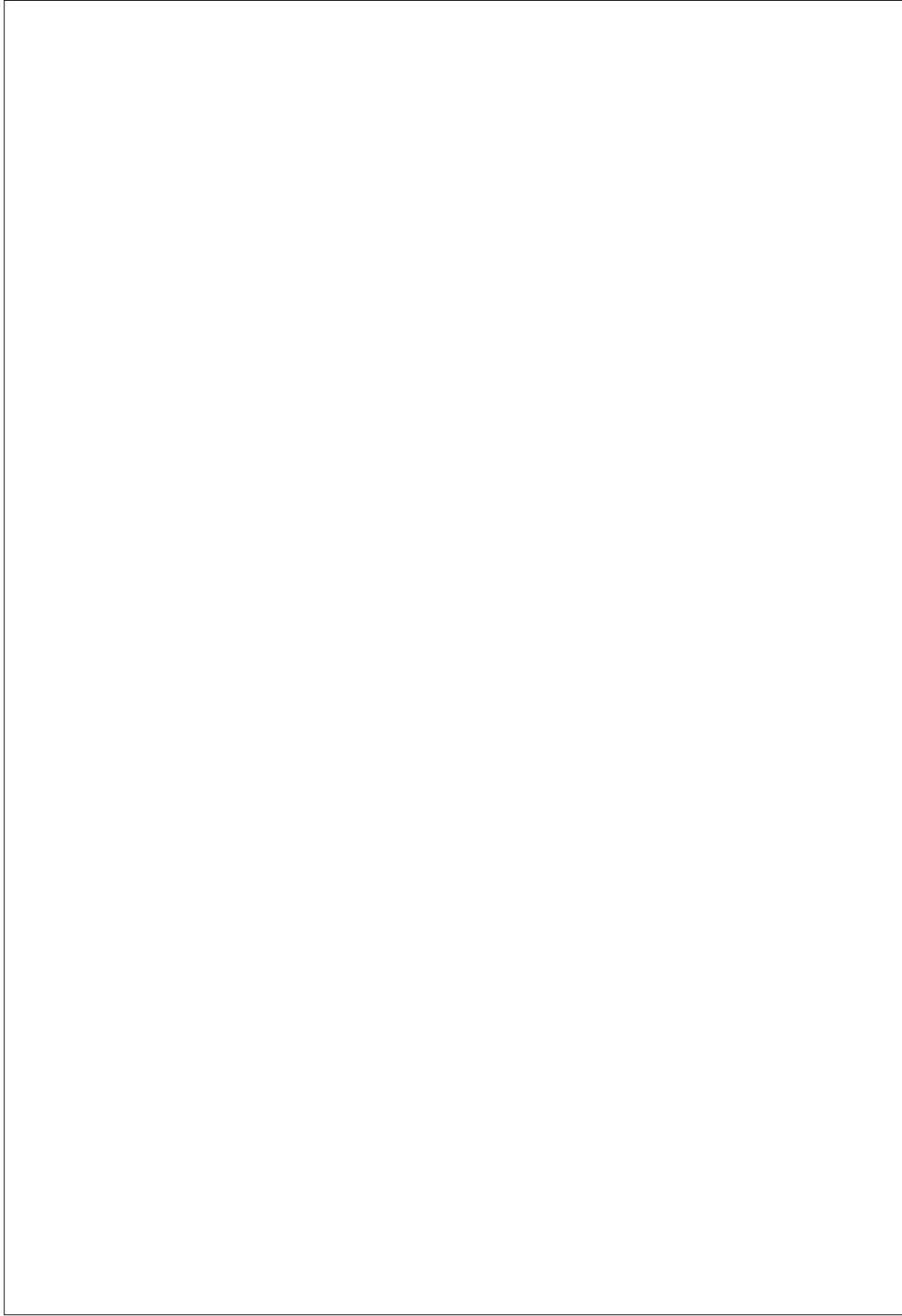
TOYS FROM TRASH

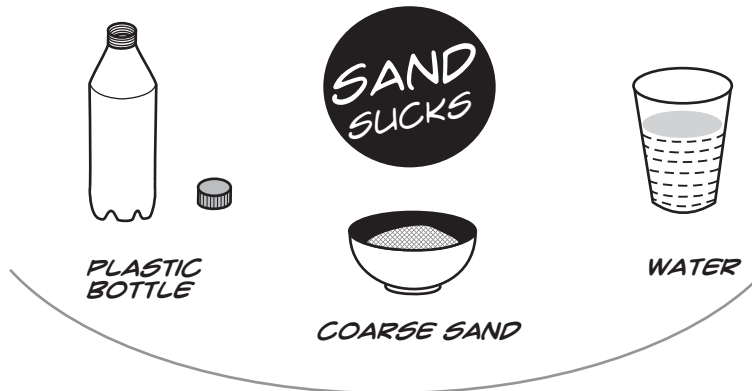
ARVIND GUPTA
ILLUSTRATIONS BY RESHMA BARVE

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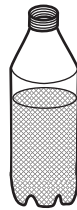
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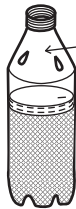




❶ FILL 3/4 BOTTLE WITH SAND.

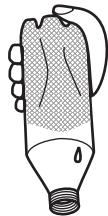


❷ ADD WATER UNTIL THE SAND IS SATURATED.



ADD SOME MORE WATER SO THAT A LITTLE FLOATS ON TOP.

❸ ON PRESSING THE BOTTLE MORE WATER SHOULD OOZE OUT FROM THE SAND. INSTEAD, THE EXTRA WATER IS SUCKED IN!!



❹ UPTURN THE PRESSED BOTTLE. SURPRISINGLY, NO WATER FALLS!!!

ON PRESSING, THE SAND STRUCTURE BREAKS CREATING INNER CAVITIES THAT SUCK IN THE EXTRA WATER.

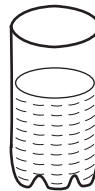


- 1 CUT BOTTLE 10-CM FROM TOP.



- 2 FILL IT WITH TAP WATER.

- 3 A FRESH EGG WILL SINK IN TAP WATER.

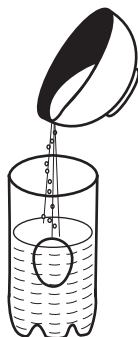


- 4 ADD SALT AND KEEP STIRRING. ADD ENOUGH SALT SO THAT THE FRESH EGG FLOATS.



- 5 ATTACH THE TOP PART OF THE BOTTLE WITH TAPE.

- 6 NOW DROP BOTTLE FROM A HEIGHT OF SIX FEET.



THE EGG WILL NOT BREAK BECAUSE IT FLOATS IN A FLUID WITH THE SAME DENSITY - LIKE A BABY IN A MOM'S BELLY.

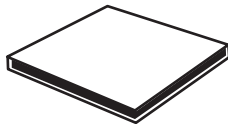


REPEAT THIS EXPERIMENT WITHOUT SALT AND THE EGG WILL BREAK.



ATOMIC ARRAY

CYCLE
BALL
BEARINGS

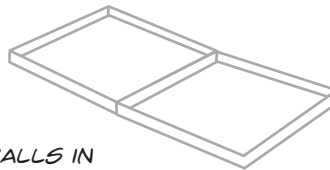


CD/DVD
COVER

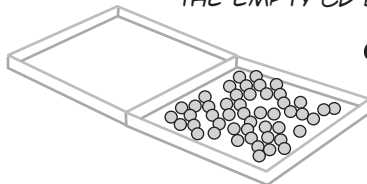


TAPE

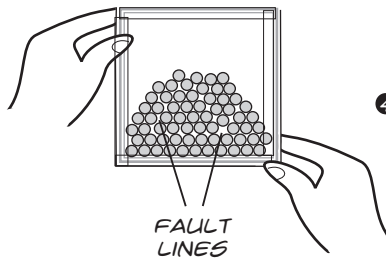
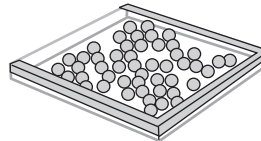
- 1 OPEN THE CD COVER AND REMOVE THE CD HOLDER.



- 2 PLACE LOTS OF BALLS IN THE EMPTY CD BOX.

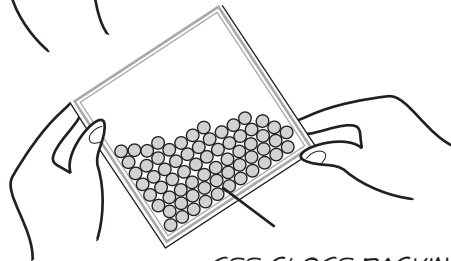


- 3 SEAL JOINTS WITH TAPE. SHAKE THE BOX AND ENJOY THE RANDOM BROWNIAN MOTION OF THE STEEL BALLS.

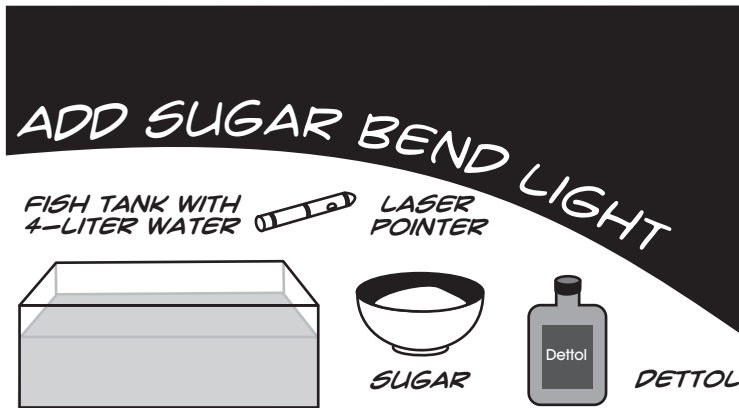


FAULT
LINES

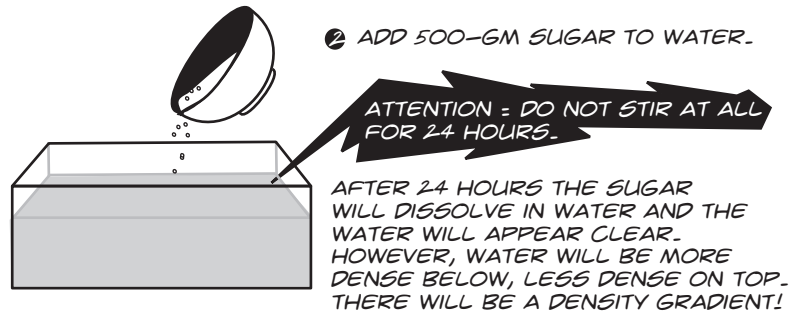
- 4 SHAKE AND OBSERVE CLOSE PACKING AND FAULT LINES AS IN AN ATOMIC ARRAY.



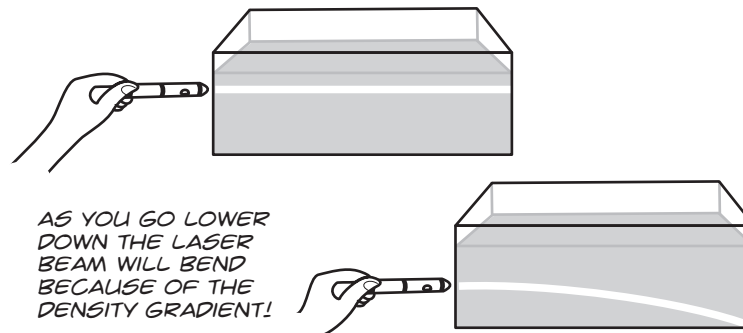
SEE CLOSE PACKING
OF ATOMS!!

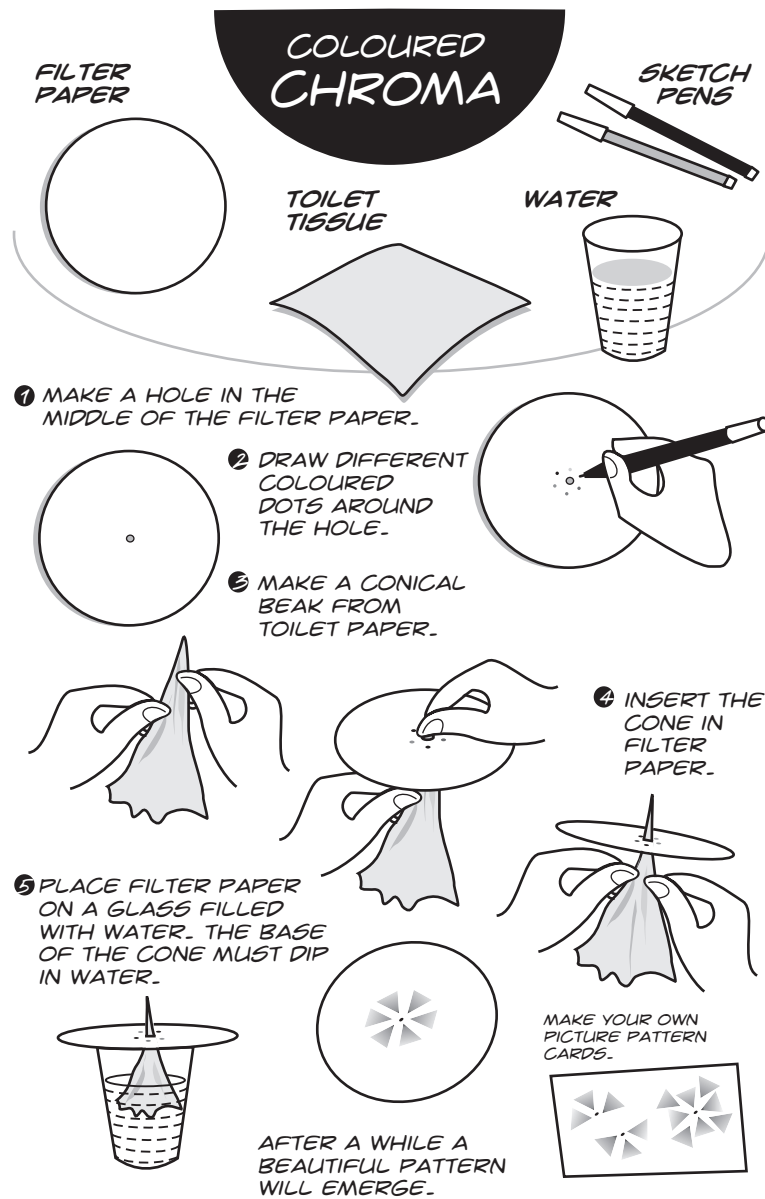


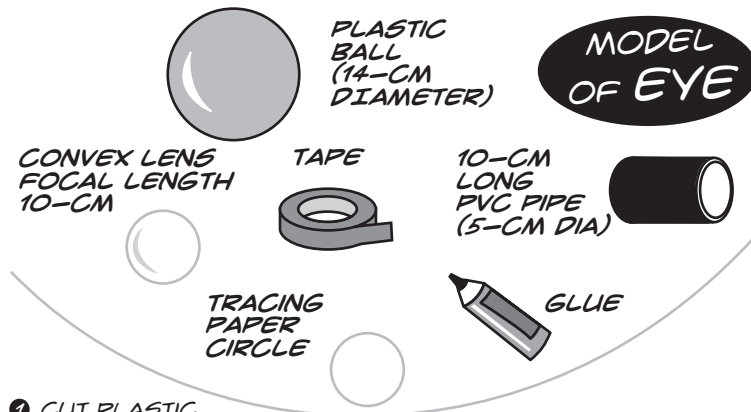
① ADD A FEW DROPS OF DETTOL TO WATER. THE DETTOL HELPS IN ILLUMINATING THE PATH OF LIGHT.



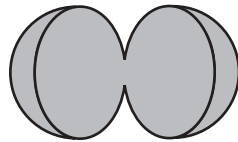
③ ON SHINING LASER ON TOP THE BEAM WILL GO STRAIGHT.



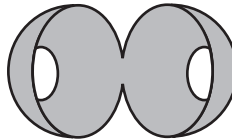




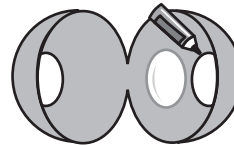
1 CUT PLASTIC BALL AS SHOWN.



2 MAKE TWO OPPOSITE HOLES OF 5-CM DIAMETER.



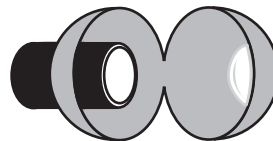
3 STICK A CONVEX LENS ON RIGHT HOLE FROM INSIDE.



4 GLUE TRACING PAPER ON ONE END OF PVC PIPE FOR RETINA.



5 INSERT PVC PIPE IN THE LEFT HOLE WITH TRACING PAPER INSIDE.



6 CLOSE THE BALL AND SEAL ITS JOINT WITH TAPE.

7 MOVE PIPE IN-OUT TO ADJUST THE DISTANCE BETWEEN LENS AND TRACING PAPER. SOON YOU WILL SEE A CLEAR IMAGE ON TRACING PAPER.



ON VIEWING THROUGH THE PVC PIPE AN INVERTED IMAGE WILL APPEAR ON THE TRACING PAPER RETINA.

CAPILLARY ACTION

TWO MICROSCOPE
SLIDES



COLOUR WATER



PAPER
CLIP



RUBBER
BAND

1 PLACE ONE SLIDE
ON TOP OF THE OTHER.



2 INSERT A PAPER CLIP BETWEEN
THE SLIDES AT ONE END. PLACE A
RUBBER BAND ON THE OTHER END.



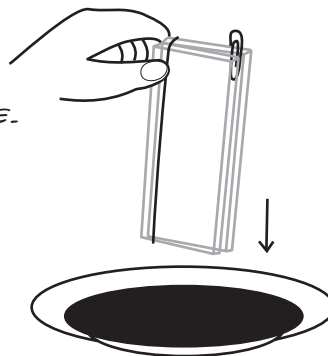
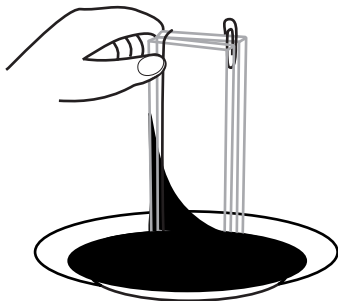
LESS
GAP



MORE
GAP

3 PLACE THE SLIDES
VERTICALLY IN
COLOUR WATER.

BECAUSE OF SURFACE TENSION,
THE COLOUR WATER WILL RISE
IN A BEAUTIFUL PARABOLIC CURVE.



SOLID LIQUID



2-PARTS
CORN FLOUR



1-PART
WATER



BIG BOWL



- 1 MIX 2-PARTS OF CORN FLOUR WITH ONE PART OF WATER.

CORN FLOUR + WATER MAKES A VERY GOOD SLURRY.

- 2 SLOWLY DIP YOUR FINGERS IN THE SLURRY. YOUR FINGERS WILL GO IN QUITE EASILY.



- 3 NOW PUNCH HARD ON THE SURFACE OF THE SLURRY. YOU WILL ENCOUNTER A SOFT WALL. YOUR FIST WILL NOT GET WET.



CORN PARTICLES COME TOGETHER AS YOU PUNCH HARD. THIS MAKES THE SLURRY SOLID. THE SURFACE OF THE SLURRY ACTS LIKE A SOFT WALL.



TENSEGRITY STRUCTURES

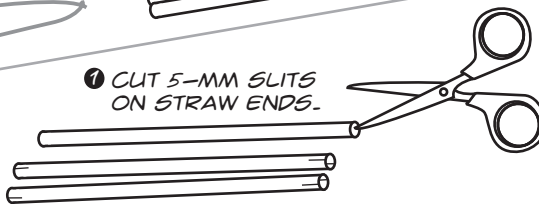
FOUR WOOL LOOPS
(36-CM PERIMETER)



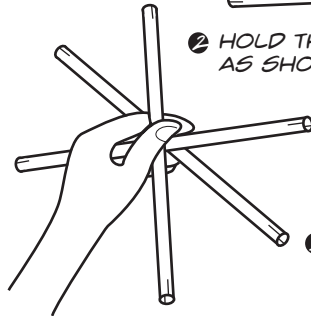
THREE STIFF STRAWS
(17-CM LONG)



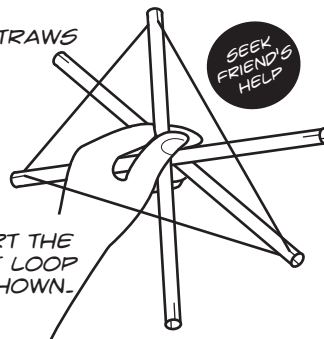
1 CUT 5-MM SLITS
ON STRAW ENDS.



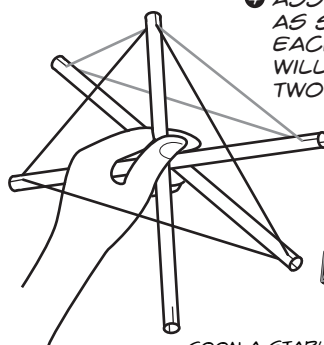
2 HOLD THREE STRAWS
AS SHOWN.



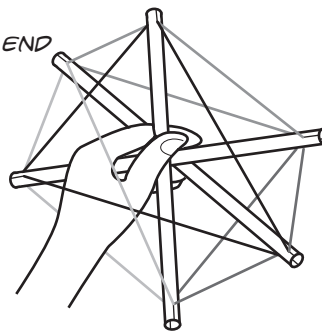
SEEK
FRIEND'S
HELP



3 INSERT THE
FIRST LOOP
AS SHOWN.



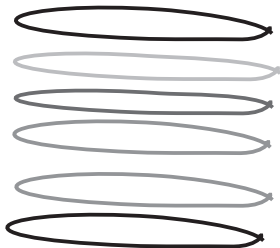
4 ASSEMBLE
AS SHOWN.
EACH STRAW END
WILL HAVE
TWO LOOPS.



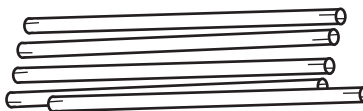
SOON A STABLE, SELF-STANDING
OCTAHEDRON WILL EMERGE!!!

MAKE ANOTHER STRUCTURE!

**SIX WOOL LOOPS
(35-CM PERIMETER)**



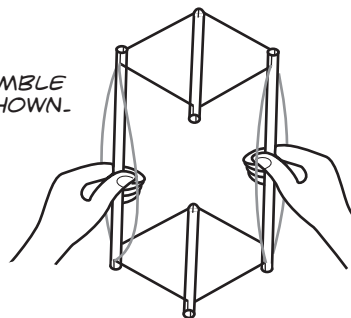
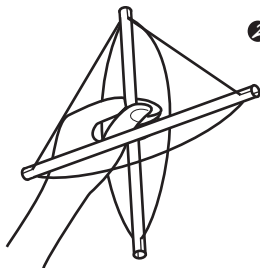
**SIX STIFF STRAWS
(15-CM LONG) WITH
5-MM SLITS ON ENDS**



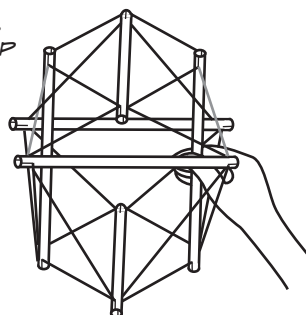
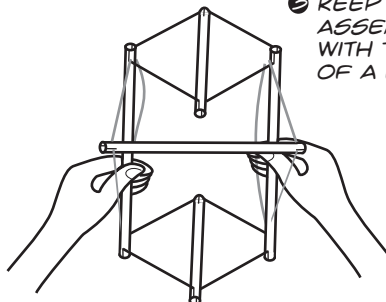
**1 INSERT WOOL LOOPS
IN THE NOTCHES OF
ALL SIX STIFF STRAWS
AS SHOWN.**



**2 ASSEMBLE
AS SHOWN.**

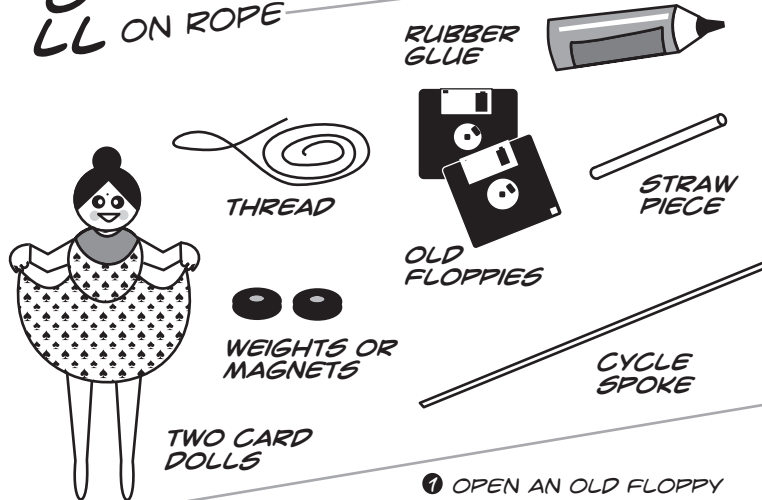


**3 KEEP
ASSEMBLING
WITH THE HELP
OF A FRIEND.**



**ALL THE STRAWS WILL BE UNDER COMPRESSION AND THE
WOOL LOOPS WILL BE IN TENSION. SOON A STABLE AND
ELEGANT STRUCTURE WILL EMERGE.**

DOLL ON ROPE

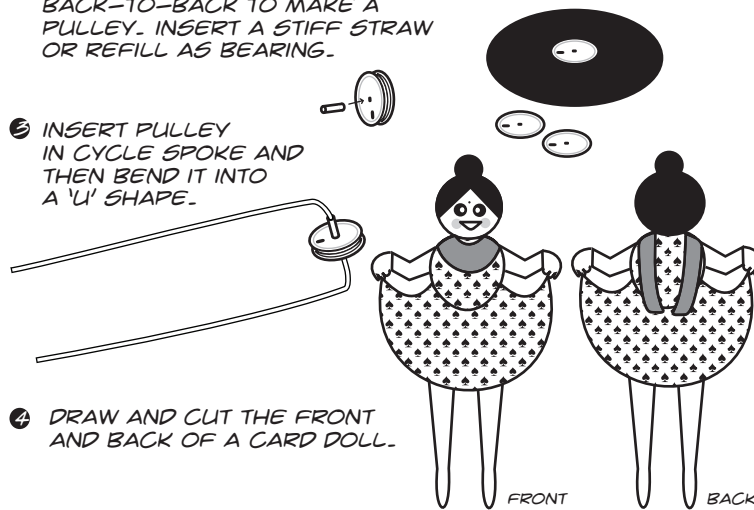


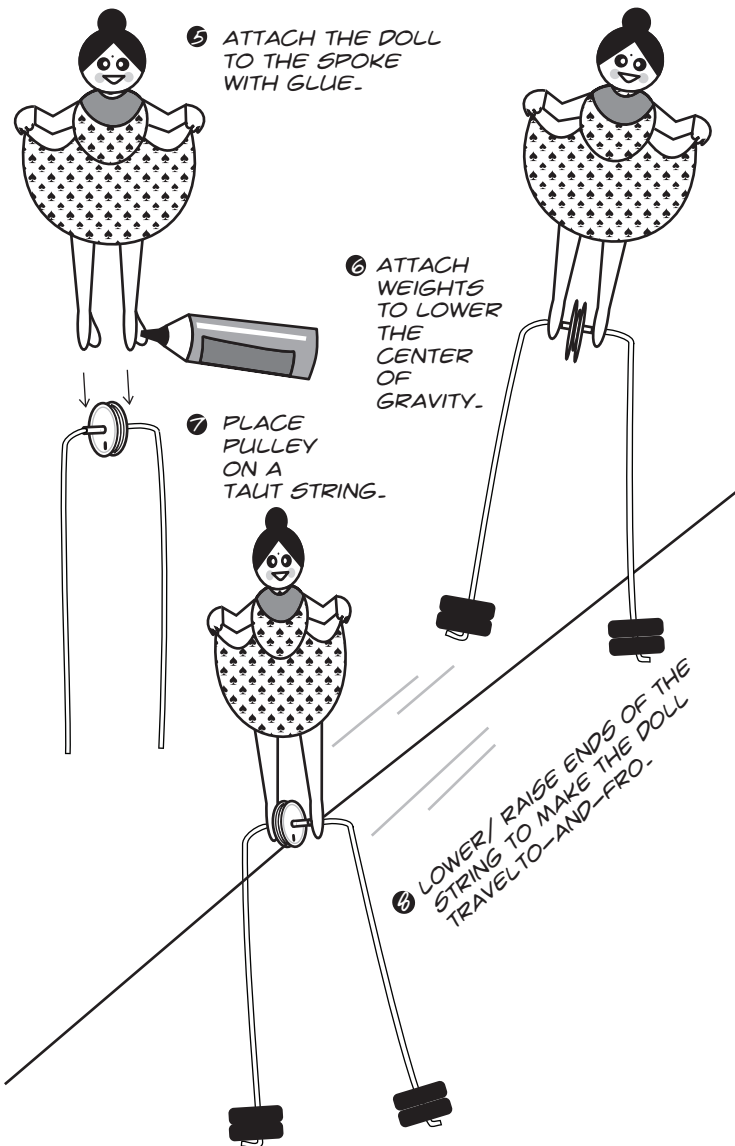
2 STICK TWO DISCS BACK-TO-BACK TO MAKE A PULLEY. INSERT A STIFF STRAW OR REFILL AS BEARING.

3 INSERT PULLEY IN CYCLE SPOKE AND THEN BEND IT INTO A 'U' SHAPE.

4 DRAW AND CUT THE FRONT AND BACK OF A CARD DOLL.

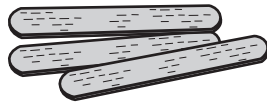
1 OPEN AN OLD FLOPPY AND REMOVE ITS CIRCULAR FILM. ALSO REMOVE TWO METAL DISCS.





STICK MAN

THREE ICE-CREAM STICKS



BOTTLE LIDS

RUBBER GLUE



BOTTLE FILLED WITH SAND

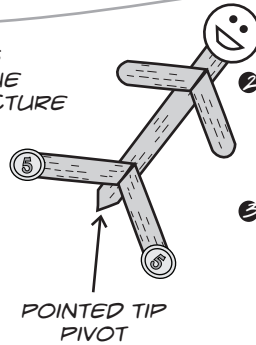
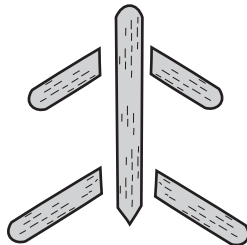


COINS AS WEIGHTS



CUTTER

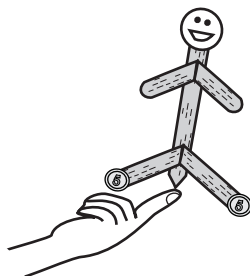
- 1 CUT ICE-CREAM STICKS WITH A CUTTER AND GLUE THEM TO MAKE A STRUCTURE AS SHOWN.



- 2 STICK A BOTTLE CAP AS HEAD. THEN DRAW A FACE.

- 3 STICK COINS ON FEET TO LOWER THE CENTER OF GRAVITY.

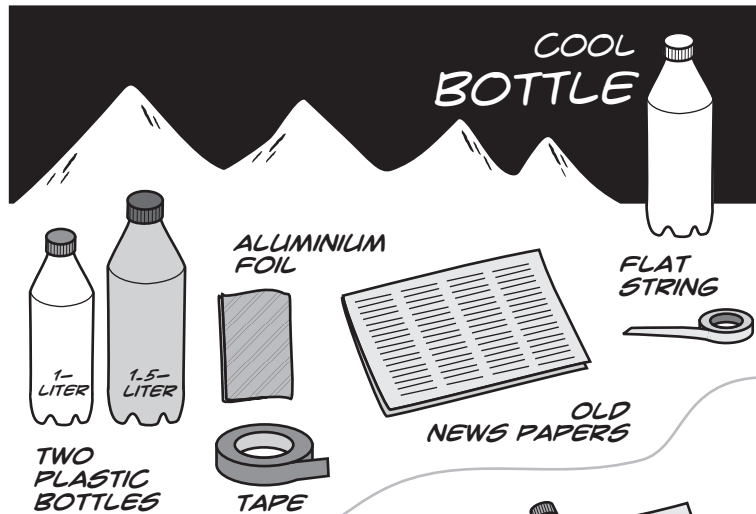
- 4 PLACE THE POINTED TIP OF THE STICK MAN ON THE LID OF A HEAVY BOTTLE FILLED WITH SAND.



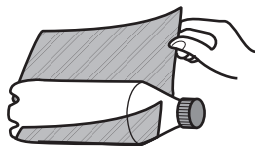
- 5 THE TOY WILL BALANCE ITSELF WITHOUT FALLING. PUSH IT A LITTLE AND IT WILL ROCK AND SPIN AROUND.

YOU CAN ALSO BALANCE IT ON YOUR FINGER TIP.





1 WRAP FOIL ON A 1-LITER BOTTLE.

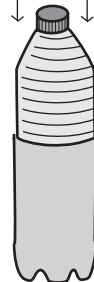


2 THEN WRAP IT IN SIX LAYERS OF NEWSPAPER FOR INSULATION.



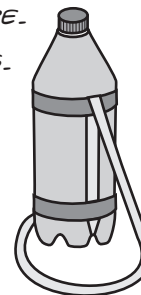
3 CUT A 1.5-LITER BOTTLE AS SHOWN.

4 PLACE 1-LITER BOTTLE IN THE BIG BOTTLE.

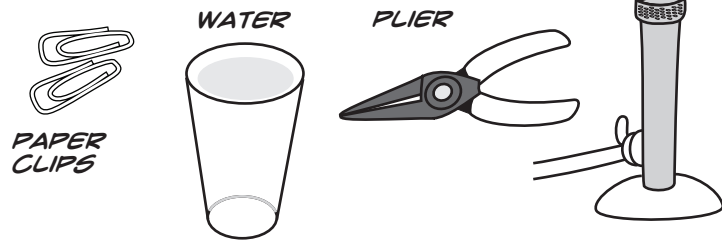


5 JOIN THE TWO HALVES OF THE BIG BOTTLE WITH TAPE. ATTACH A STRING TO COMPLETE THE THERMOS.

WATER WILL REMAIN COOL IN THIS THERMOS FOR A FEW HOURS.



ANNEALING IN ACTION



1 OPEN AND STRAIGHTEN TWO PAPER CLIPS.



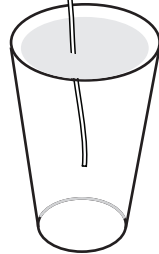
2 HOLD ONE END OF THE WIRE WITH A PLIER.



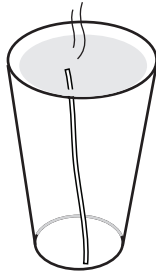
3 HEAT THIS WIRE ON A GAS FLAME FOR TWO MINUTES.



4 THEN PLUNGE THIS RED HOT WIRE IMMEDIATELY IN COLD WATER.



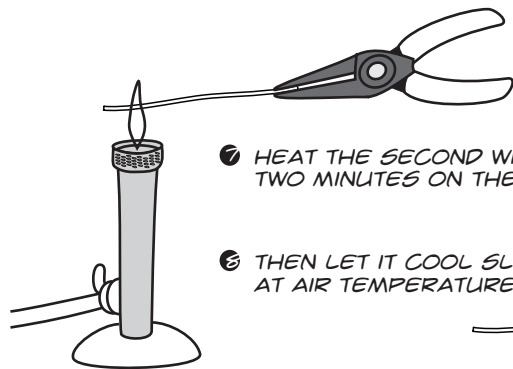
5 AFTER IT COOLS...



6 ...TRY BENDING IT.



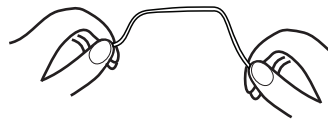
THIS WIRE WILL BECOME HARD LIKE SPRING STEEL. IT'S CALLED 'TEMPERING'!



7 HEAT THE SECOND WIRE TOO FOR TWO MINUTES ON THE GAS FLAME.

8 THEN LET IT COOL SLOWLY AT AIR TEMPERATURE.

9 BEND IT.



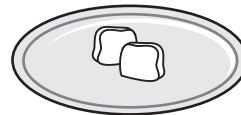
THIS WIRE WILL BECOME SOFT AND WILL BEND EASILY. THIS IS CALLED 'ANNEALING'.

MINI SOLAR HEATER

GLASS

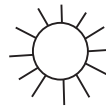


TWO
ICE
CUBES



1 PLACE TWO SIMILAR ICE CUBES ON TWO PLATES AND KEEP THEM IN THE SUN.

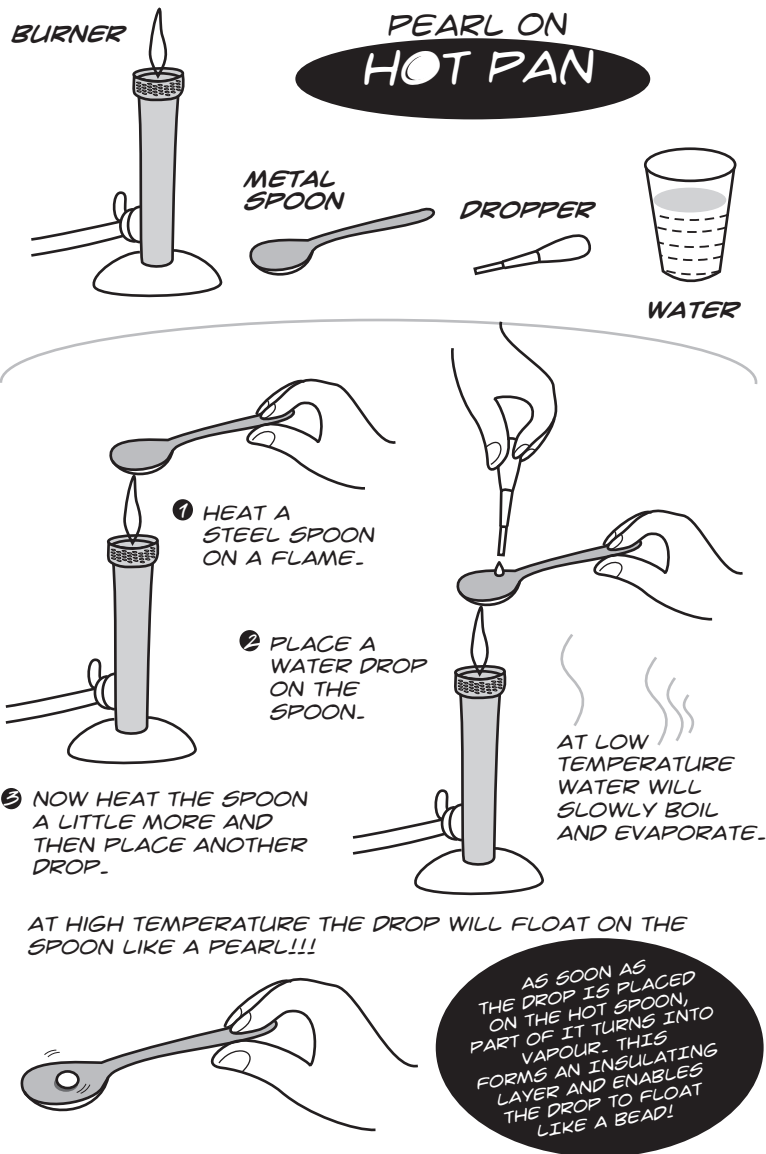
2 COVER ONE CUBE WITH A TRANSPARENT GLASS.

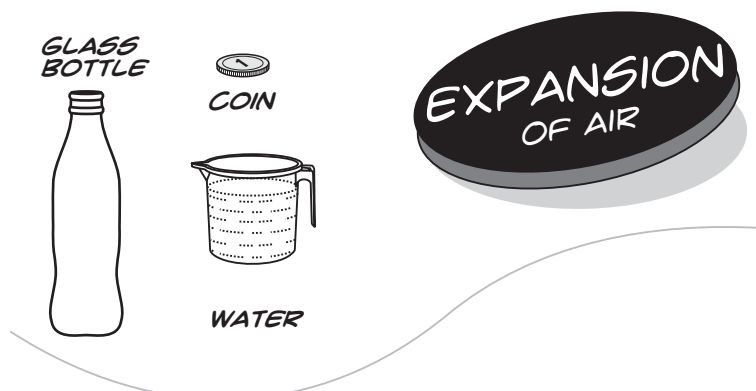


AFTER A FEW MINUTES THE COVERED CUBE WILL MELT A LOT MORE.

THE GLASS WILL ACT LIKE A MINI SOLAR COOKER.







1 WET A COIN---

2 ...AND PLACE IT ON THE MOUTH OF A GLASS BOTTLE.



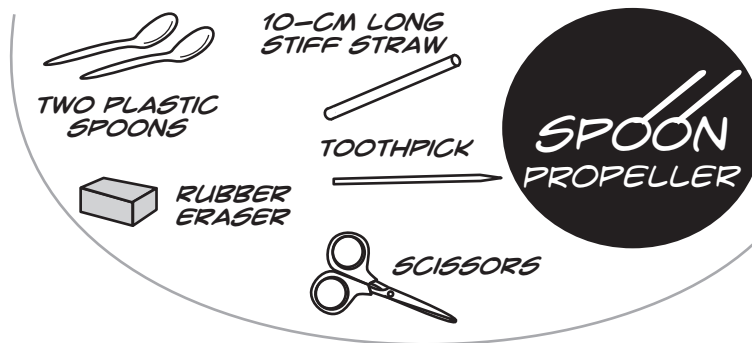
3 RUB YOUR PALMS TO WARM THEM AND PRESS THEM ON THE BOTTLE.



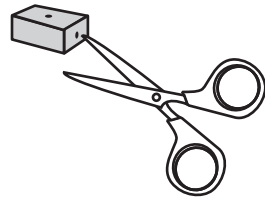
4 AFTER A WHILE THE AIR INSIDE WILL EXPAND AND THE COIN WILL RISE AND FALL WITH A PLUCK SOUND!



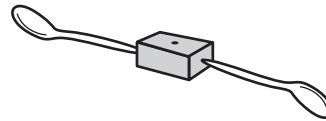
THIS SIMPLE EXPERIMENT SHOWS THAT AIR EXPANDS ON HEATING!



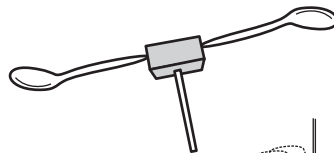
- 1 MAKE HOLES IN A RUBBER ERASER.



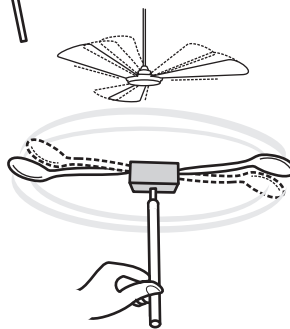
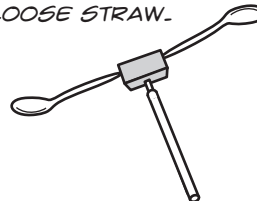
- 2 INSERT SPOONS IN THE RUBBER. THEY SHOULD BE INCLINED IN OPPOSITE DIRECTIONS.



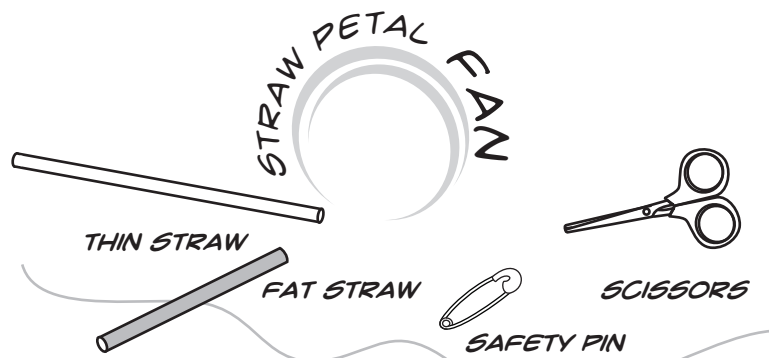
- 3 INSERT A TOOTHPICK IN THE RUBBER AS SHOWN.



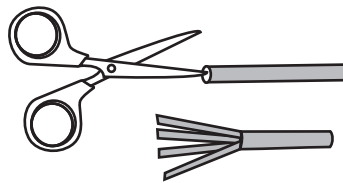
- 4 PLACE THE TOOTHPICK IN A STIFF AND LOOSE STRAW.



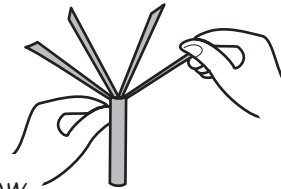
- 5 PLACE UNDER A CEILING FAN TO MAKE THE SPOON PROPELLER SPIN!



1 CUT FOUR, 5-CM LONG PETALS IN A FAT STRAW.



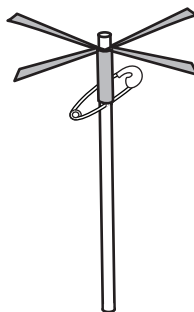
2 TWIST THE PETALS TO MAKE FAN BLADES.



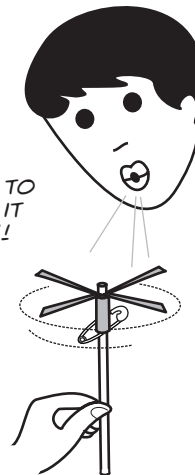
3 FIX A SAFETY PIN IN A THIN STRAW. THE PIN WILL PREVENT THE FAN FROM FALLING.



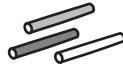
4 PLACE THE STRAW PETAL FAN IN THE THIN STRAW.



5 BLOW TO MAKE IT SPIN!!!



THREE
STRAW
PIECES
(5-CM LONG)



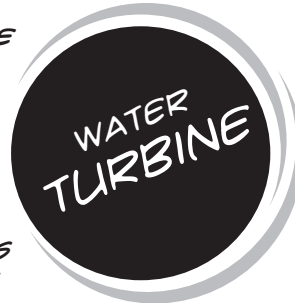
FLEXI-WIRE



WATER
BOTTLE



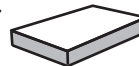
SCISSORS



BICYCLE
SPOKE



PIECE OF
RUBBER
(OLD
SLIPPER)

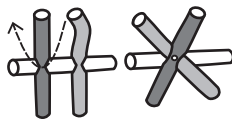


CLEAN
SALINE
TUBE
(IV KIT)



1 MAKE CUTS IN TWO
STRAW PIECES.

2 ASSEMBLE TURBINE AS SHOWN.
MAKE A HOLE IN THE CENTRE.
INSERT A WIRE AXLE. MAKE
LOOPS ON BOTH ENDS OF WIRE.
THE LOOPS ACT AS STOPPERS.

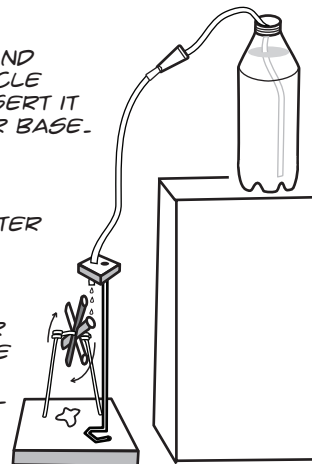


3 MAKE A STAND
USING A CYCLE
SPOKE. INSERT IT
IN A RUBBER BASE.

4 DIP ONE END
OF SALINE
TUBE IN A WATER
BOTTLE KEPT
HIGH UP.

5 FIX THE OTHER
END OF SALINE
TUBE IN THE
RUBBER HOLE.

THE DRIPPING WATER FROM THE
SALINE TUBE WILL ROTATE THE TURBINE!!!



ANIMATION ON FLYWHEEL

PAPER CUP



RUBBER GLUE



BIRD AND CAGE ON CARDS



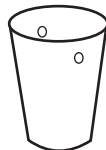
12-CM LONG
CYCLE
SPOKE



STIFF
STRAW

BEADS THREAD

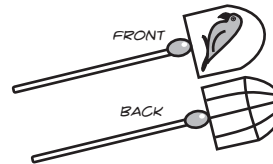
- 1 MAKE TWO HOLES IN A PAPER CUP.



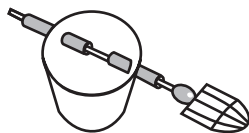
- 2 WEAVE A STIFF STRAW THROUGH THE HOLES AND FIX IT WITH RUBBER GLUE.



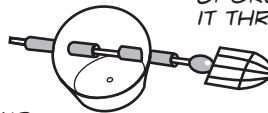
- 3 STICK PARROT AND CAGE BACK-TO-BACK ON A CYCLE SPOKE. WEAVE A BEAD IN THE SPOKE.



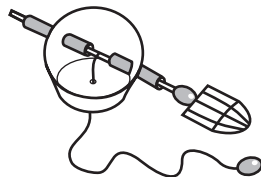
- 4 CUT MIDDLE PART OF STRAW AND WEAVE SPOKE IN IT.



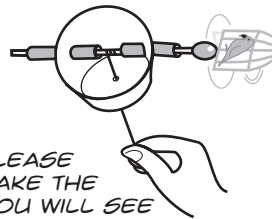
- 5 MAKE A HOLE IN THE BASE. TIE THREAD TO SPOKE AND WEAVE IT THROUGH THE HOLE.



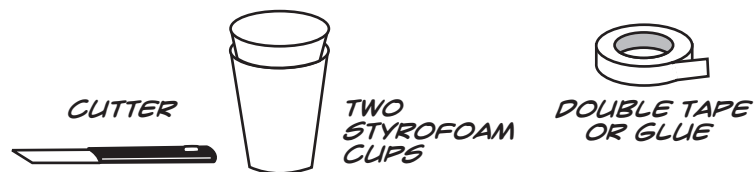
- 6 TIE BEAD ON OTHER END OF THREAD. WIND THREAD ON SPOKE.



- 7 PULL AND RELEASE THREAD TO MAKE THE CARD SPIN. YOU WILL SEE THE BIRD INSIDE THE CAGE.



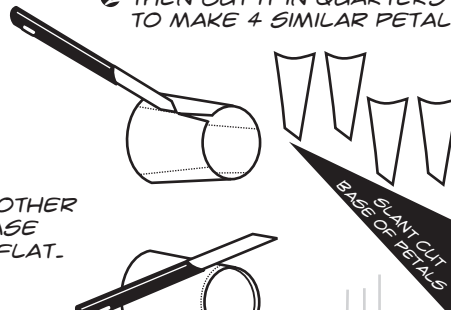
CUP HELICOPTER



1 REMOVE THE BASE OF ONE CUP.



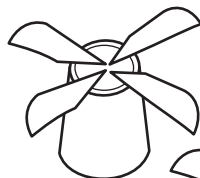
2 THEN CUT IT IN QUARTERS TO MAKE 4 SIMILAR PETALS.



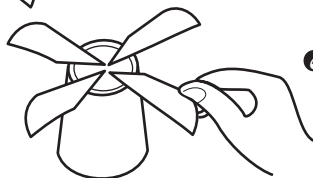
3 CUT RIM OF OTHER CUP. ITS BASE SHOULD BE FLAT.



4 STICK DOUBLE TAPE ON ITS BASE AND FIX FOUR PETALS.

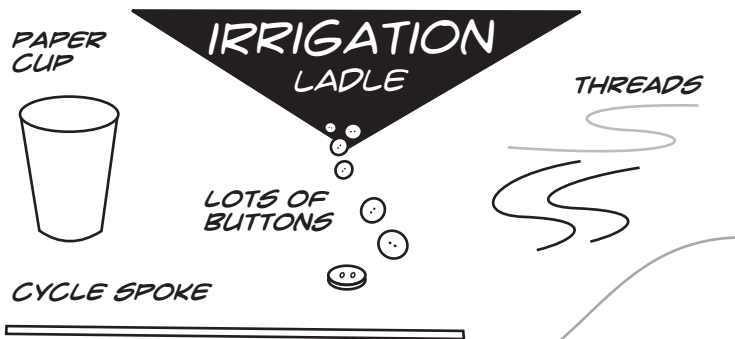


5 TWIST PETALS TO MAKE BLADES.



6 DECORATE AND DROP THE CUP FROM A HEIGHT. THE CUP HELICOPTER WILL COME DOWN SPINNING.





1 TIE TWO SHORT THREADS ON THE RIM OF A CUP.



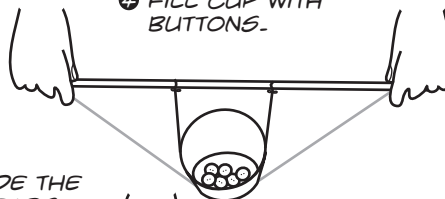
2 ALSO TIE TWO LONG THREADS NEAR THE BASE.



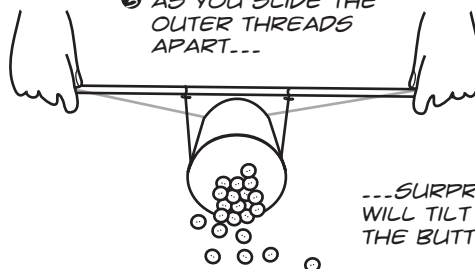
3 HANG THE CUP FROM A CYCLE SPOKE AS SHOWN.



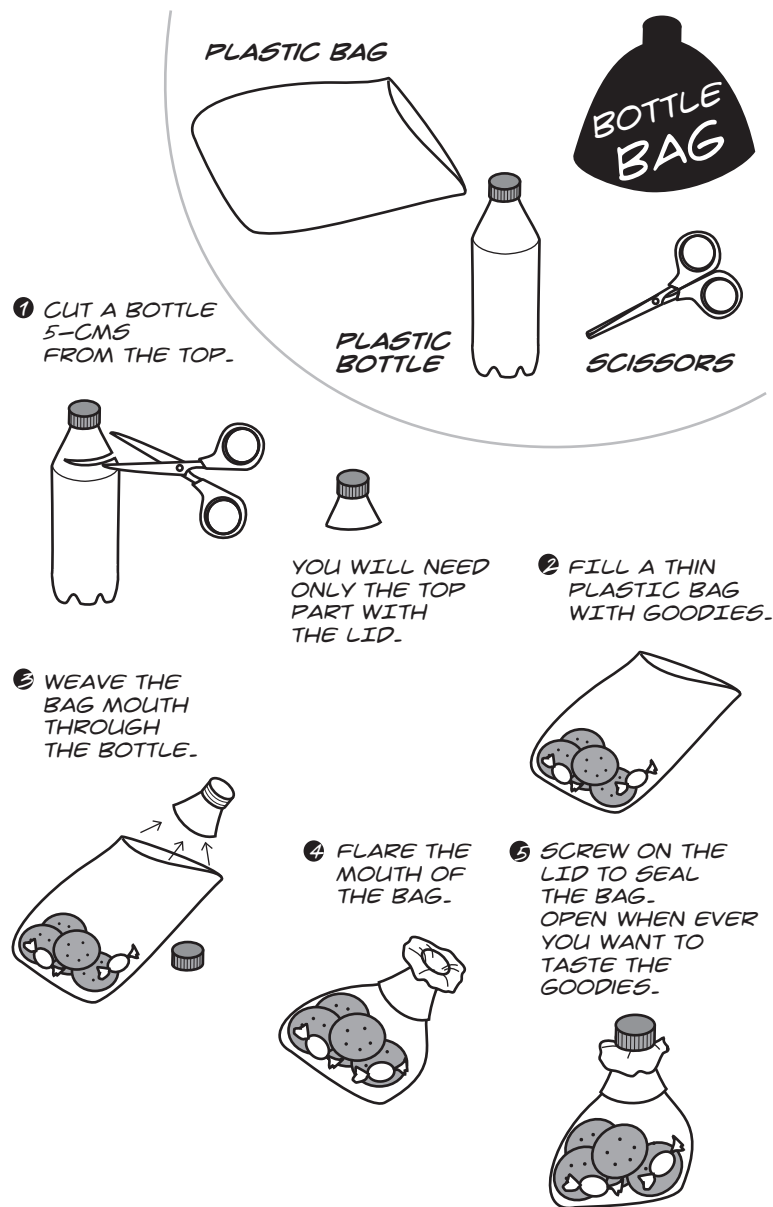
4 FILL CUP WITH BUTTONS.



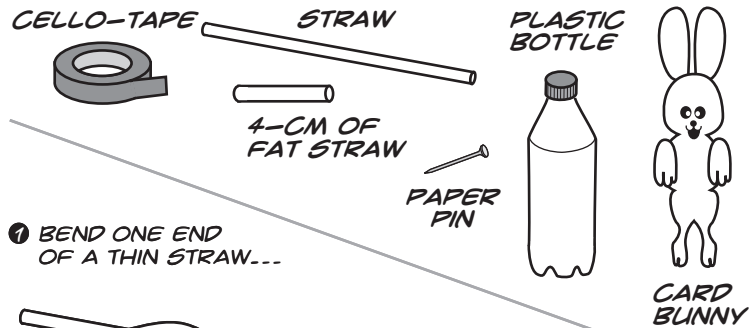
5 AS YOU SLIDE THE OUTER THREADS APART...



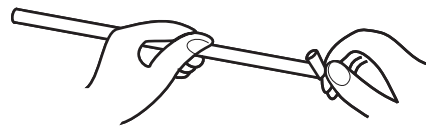
...SURPRISINGLY THE CUP WILL TILT AND UNLOAD THE BUTTONS.



SM UP DOWN BUNNY



1 BEND ONE END OF A THIN STRAW...



2 ...AND SEAL IT WITH TAPE.

3 STICK TWO BUNNIES BACK-TO-BACK ON THE SEALED END.



4 MAKE A HOLE IN THE LID AND GLUE A PIECE OF FAT STRAW.

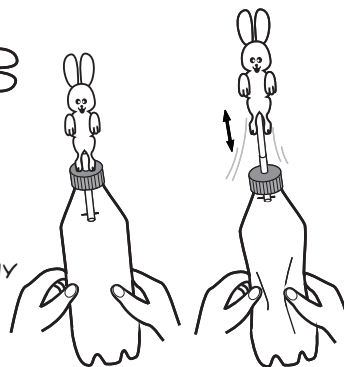


5 PLACE BUNNY STRAW IN THE LID AND INSERT A PIN AS A STOPPER.



6 PLACE PIN END IN BOTTLE. THEN SCREW THE LID ON.

7 PRESS BOTTLE TO MAKE BUNNY JUMP. ON RELEASING PRESSURE THE BUNNY WILL COME DOWN.



- 1 CUT THE TOP OF A CAN.



ALUMINIUM CAN



ALUMINIUM CAN BOWL

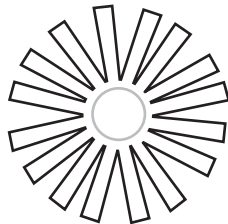
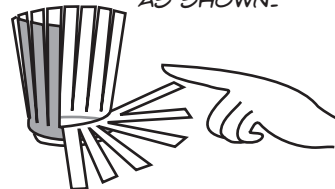
SCISSORS



- 2 THEN CUT LONG THIN STRIPS ALONG ITS HEIGHT.

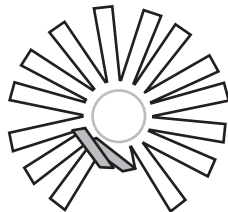


- 3 BEND ALL THE PETALS OUTWARDS AS SHOWN.



THE PETALS WILL LOOK LIKE THE SUN'S OUTGOING RAYS.

- 4 FOLD EACH PETAL TO TOUCH THE CAN'S RIM.



- 5 KEEP FOLDING AND TUCK IN THE LAST STRIP TO MAKE A BEAUTIFUL BOWL.



KEEP SMALL TRINKETS IN THIS BOWL!!!





1-LITER
TETRA
PACK



SCISSORS



NEEDLE
THREAD



VELCRO
STRIPS

STAPLER



1 OPEN ALL TRIANGULAR FLAPS OF THE TETRA PACK.



2 FLATTEN IT.

3 CUT ITS TOP AND BOTTOM.



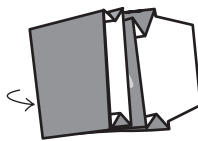
4 CUT FLAP AS SHOWN.



5 FOLD THICKNESS INWARDS.

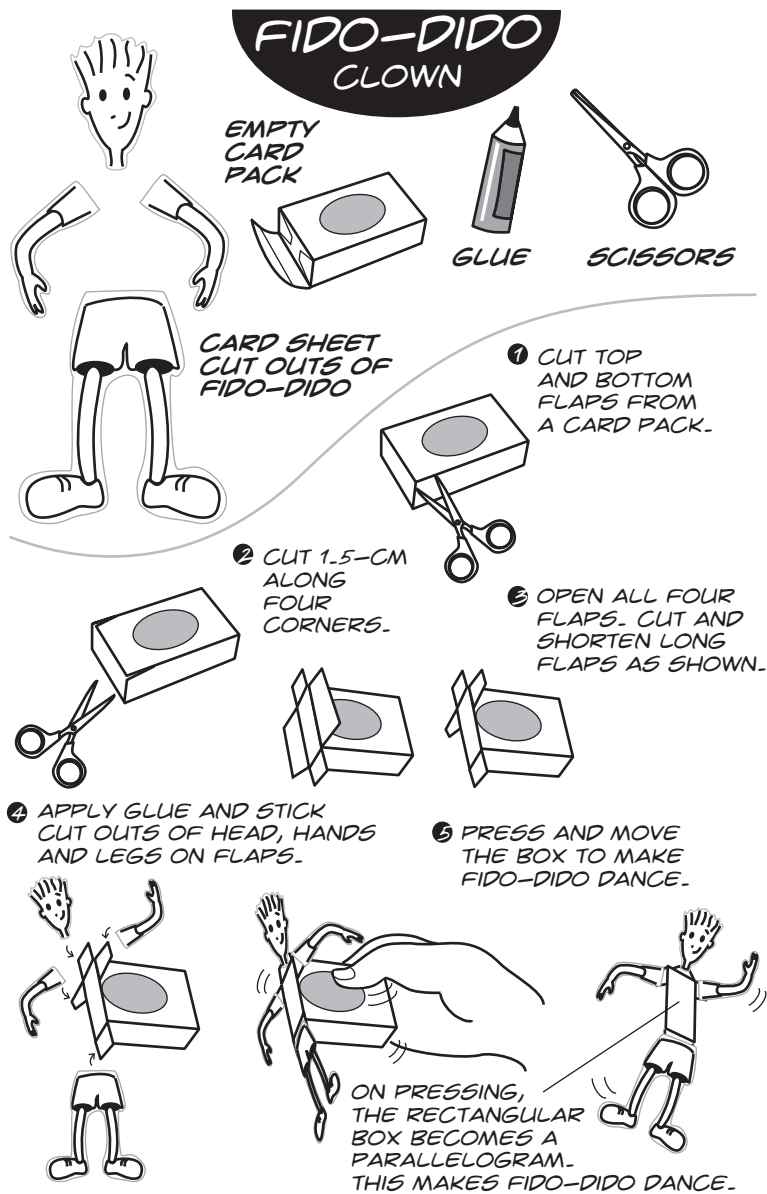
7 STAPLE INNER LAYERS SO THAT IT DOES NOT OPEN.

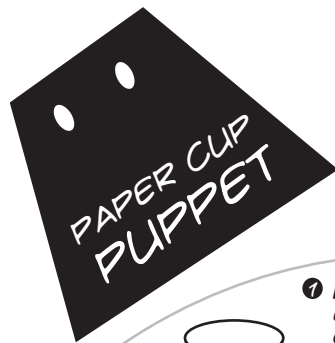
6 FOLD IN HALF.



8 SEW VELCRO STRIPS TO OPEN AND CLOSE PURSE.







PAPER CUP



SKETCH PENS

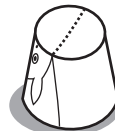


SCISSORS

1 DRAW RABBIT EARS AND FACE ON A PAPER CUP.



2 DRAW MIDLINE ON BOTTOM AS SHOWN.



3 CUT TO MAKE THE RABBIT'S FACE.



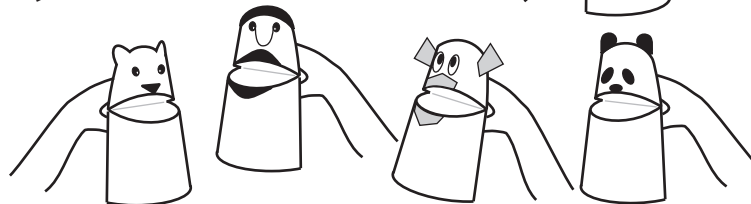
4 FOLD ON THE DOTTED LINE.

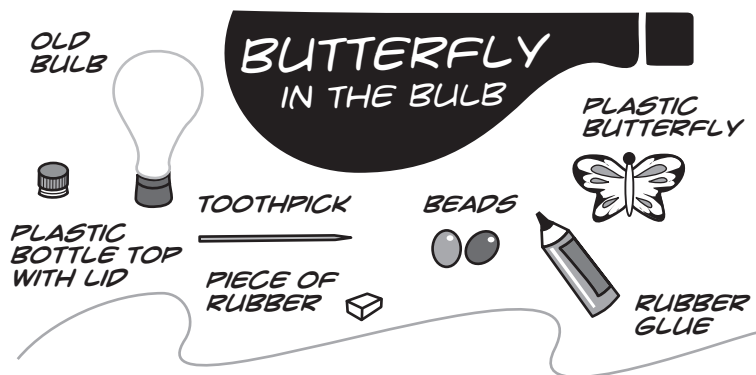


5 PRESS AND RELEASE FROM BEHIND TO MAKE PUPPET TALK.



COLOR, DECORATE AND MAKE SEVERAL DIFFERENT PUPPETS.





- 1 REMOVE THE BASE OF A FUSED BULB WITH ADULT HELP.



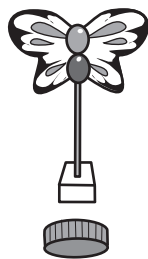
- 2 APPLY RUBBER GLUE ON PLASTIC BOTTLE TOP.



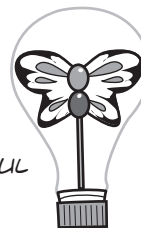
- 3 STICK BOTTLE TOP TO THE BULB MOUTH.



- 4 MAKE BUTTERFLY ASSEMBLY AS SHOWN. FIX IT INSIDE THE LID WITH GLUE.

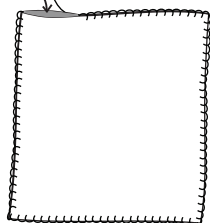


- 5 FOLD THE WINGS AND PLACE THE BUTTERFLY IN THE BULB. SCREW THE CAP. THE BUTTERFLY WILL LOOK BEAUTIFUL INSIDE THE BULB!

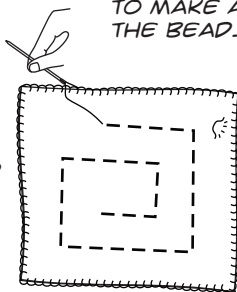




- 1 SEW TWO SIMILAR HANDKERCHIEFS ON THEIR EDGES LEAVING A LITTLE OPENING.
- 2 SLIP A BEAD IN THIS OPENING AND SEW COMPLETELY.



- 3 HEM DIFFERENT PATTERNS ON THE TWO HANDKERCHIEFS TO MAKE A MAZE FOR THE BEAD.

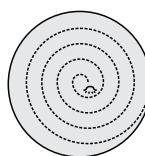
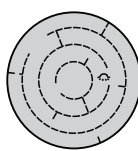
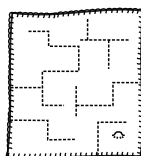


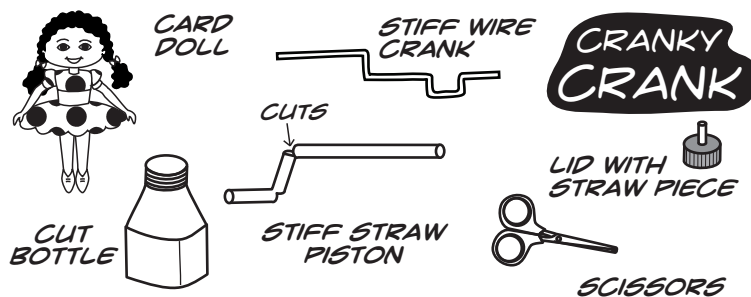
- 4 BLINDFOLD A CHILD AND ASK HIM TO NEGOTIATE THE BEAD THROUGH THE MAZE.

THIS IS AN EXCELLENT PUZZLE FOR THE VISUALLY CHALLENGED!



MAKE DIFFERENT MAZE PATTERNS.





1 MAKE TWO CUTS ON OPPOSITE ENDS OF A STIFF STRAW.

2 MAKE TWO HOLES ON THE BOTTLE AT OPPOSITE ENDS.

3 ASSEMBLE CRANK, PISTON IN THE BOTTLE.

4 INSERT PISTON THROUGH THE LID STRAW.

5 GLUE THE DOLL TO THE PISTON STRAW.

6 ASSEMBLE WIRE CRANK WITH PISTON. BECAUSE OF THE TWO CUTS THE MOVING PISTON WILL BEND AND MOVE FREELY.

THE WIRE CRANK MUST MOVE FREELY IN THE PISTON.

7 ON ROTATING THE CRANK DOLL WILL MOVE UP-AND-DOWN.

- 1 PUT HALF BRUSH IN PIPE.
HOLD PIPE VERTICALLY
AND TAP ON THE PIPE
REPEATEDLY.



ON TAPPING
THE PIPE
FROM TOP
THE BRUSH
INSTEAD OF
FALLING DOWN,
WILL MAGICALLY
CLIMB UP!



TAPPING
MOVES THE
PIPE NOT
THE BRUSH!!



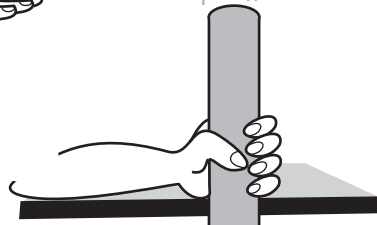
PVC PIPE (INTERNAL
DIAMETER SLIGHTLY
SMALLER THAN
BRUSH)



BOTTLE
BRUSH



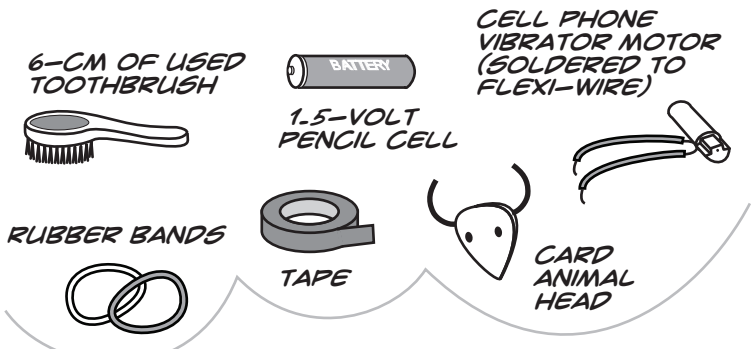
-----CLIMBING BRUSH



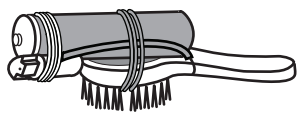
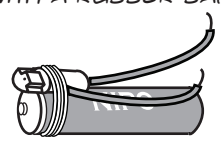
IF YOU PUT
YOUR HAND
ON A TABLETOP
THEN DESPITE
TAPPING THE
BRUSH DOES
NOT CLIMB.
IT MAY FALL
DOWN DUE
TO VIBRATIONS.



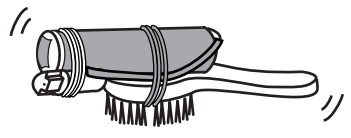
BRUSH IN RUSH.....



- 1 AFFIX VIBRATOR MOTOR TIGHTLY TO BATTERY WITH A RUBBER BAND.
- 2 FIX MOTOR-VIBRATOR ASSEMBLY ON THE TOOTHBRUSH WITH A RUBBER BAND.

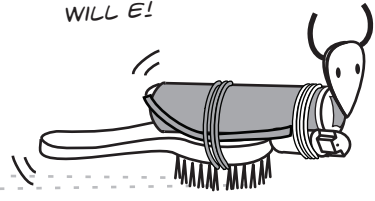


- 3 TAPE WIRE ENDS TO BATTERY TERMINALS.

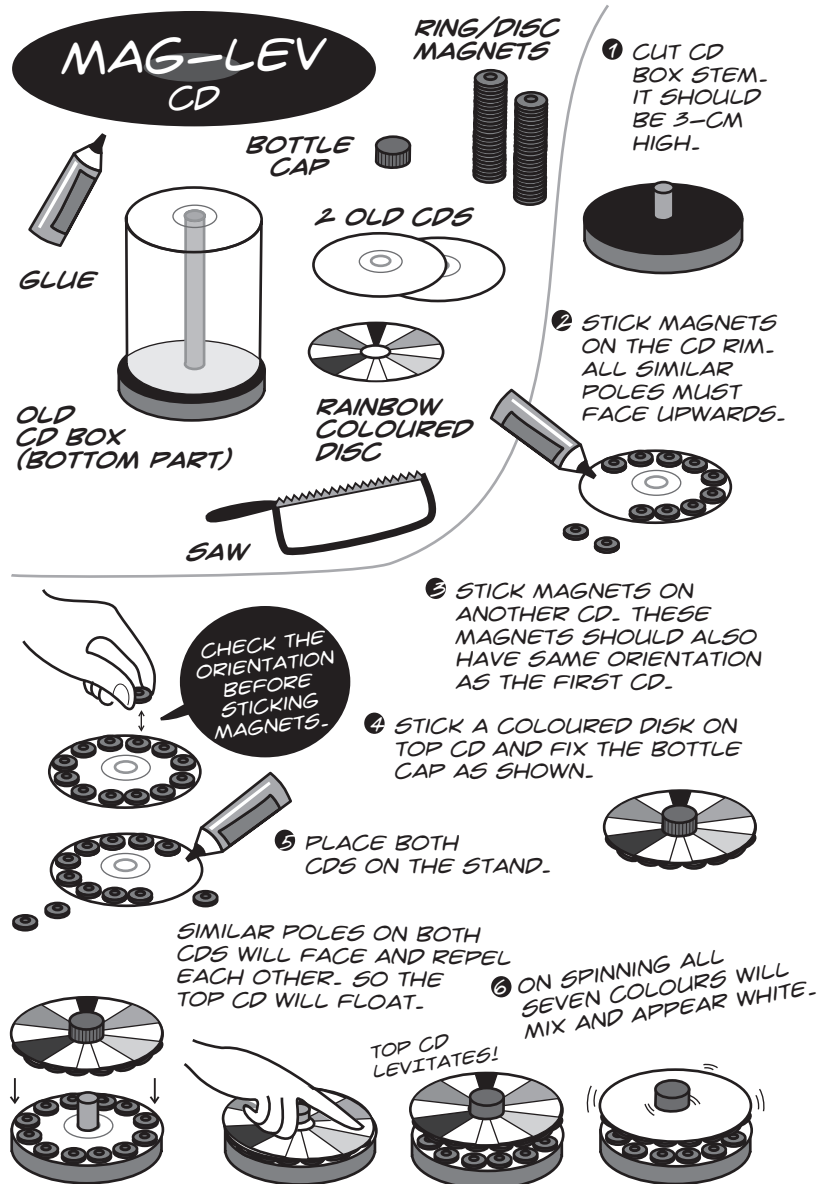


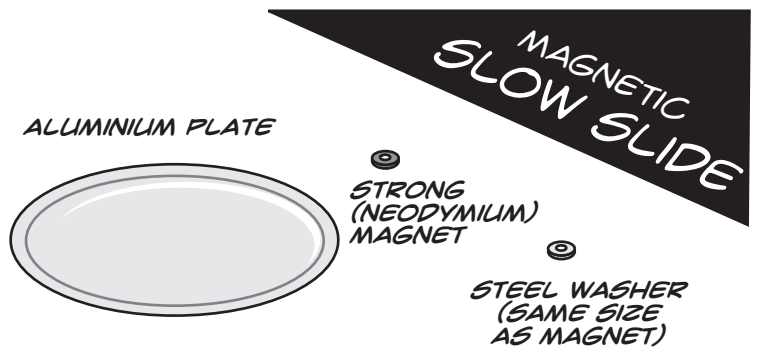
THE BRUSH WILL START VIBRATING, AND THE ANIMAL WILL E!

- 4 FIX A CARD HEAD TO MAKE IT LOOK LIKE AN ANIMAL.

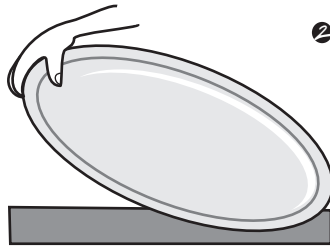


IF YOU PLACE IT ON A PLATE--- IT WILL GO ROUND AND ROLIND





1 HOLD THE ALUMINIUM PLATE AT A SLANT.



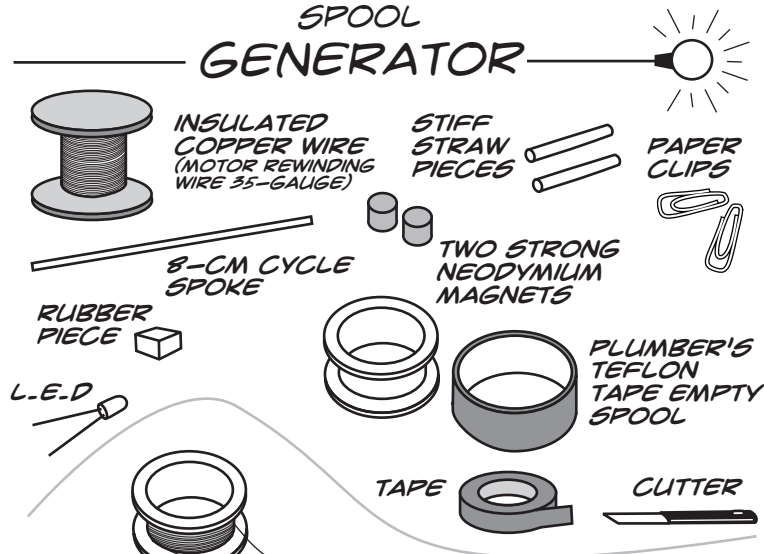
2 PLACE THE NEODYMIUM MAGNET ON THE PLATE. BECAUSE OF EDDY CURRENTS IT WILL SLIDE SLOWLY.



3 REPEAT THIS EXPERIMENT WITH A SIMILAR LOOKING STEEL WASHER.

BECAUSE OF NO EDDY CURRENTS THE STEEL WASHER WILL SLIDE FAST ON THE ALUMINIUM PLATE.

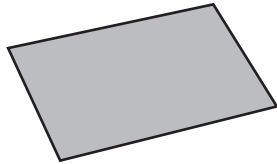
SPOOL GENERATOR



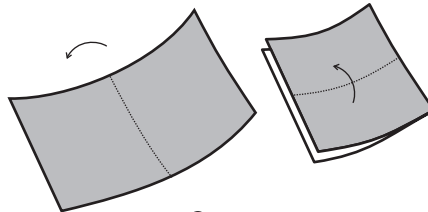
- 1 WIND 800-TURNS OF 35-GAUGE INSULATED COPPER WIRE ON THE SPOOL.
 - 2 SCRAPE INSULATION FROM THE ENDS OF WIRE.
 - 3 ATTACH L.E.D. TO ENDS AND ASSEMBLE AS SHOWN.
 - 4 TAPE TWO PAPER CLIPS (DIAMETRICALLY OPPOSITE) ON SPOOL COVER.
 - 5 POKE CYCLE SPOKE THROUGH RUBBER PIECE AND STICK 2 STRONG MAGNETS.
 - 6 INSERT STRAW PIECES AS STOPPERS. SLIP SPOKE IN CLIP BEARINGS.
 - 7 FIX COVER ON SPOOL.
- 8 SPIN SPOKE TO LIGHT THE L.E.D.

PENTAGON

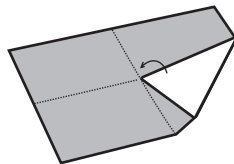
① TAKE AN A-4 SHEET.



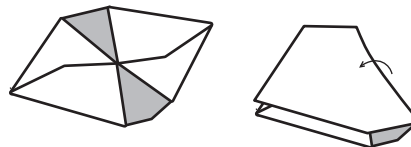
② FOLD IN QUARTER TO LOCATE ITS CENTER.



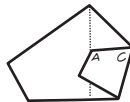
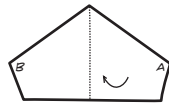
③ FOLD ALL FOUR CORNERS TO CENTER.



④ FOLD MODEL IN HALF.



⑤ FOLD POINT 'A' TO MIDLINE, SO THAT LINE AC IS PARALLEL TO THE BASE.

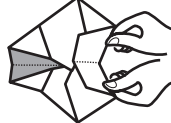


⑥ FOLD BOTH SIDES.

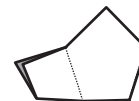
⑦ OPEN THE PENTAGON.



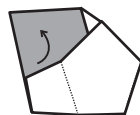
⑧ REVERSE FOLD IT.



⑨ TUCK RIGHT SIDE IN.



⑩ OPEN FLAP AS SHOWN.



⑪ REVERSE FOLD IT.

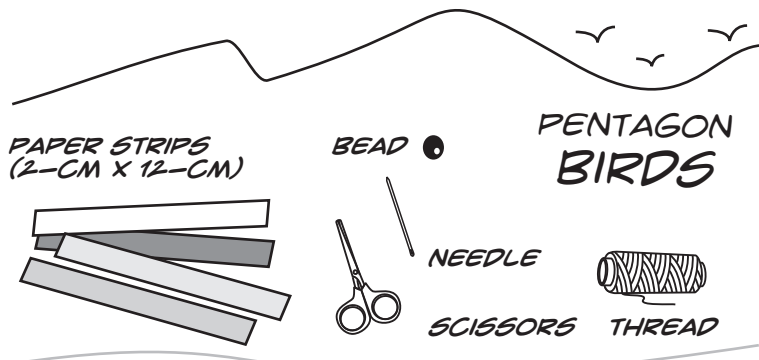


⑫ TUCK THE FLAP INSIDE...



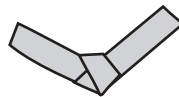
--TO MAKE A BEAUTIFUL PENTAGON!





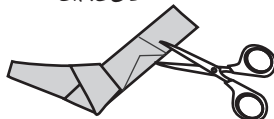
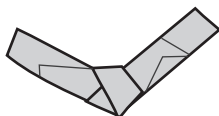
1 HOLD THE TWO ENDS OF A LONG PARALLEL PAPER STRIP AND TIE A SIMPLE KNOT.

2 GENTLY PULL THE ENDS AND YOU WILL BE SURPRISED TO SEE A PENTAGONAL KNOT IN THE MIDDLE.

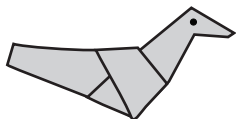


3 MARK A BEAK AND TAIL AS SHOWN.

4 CUT ALONG THE MARKED LINES.



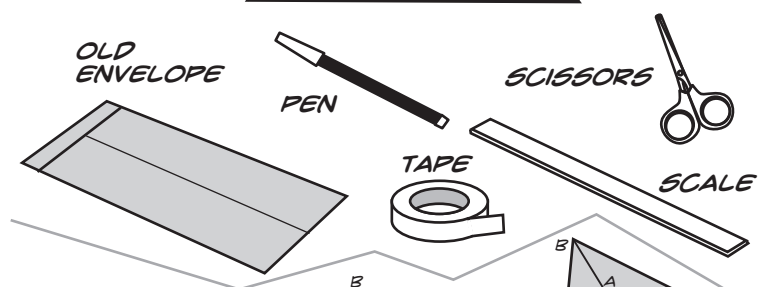
5 DRAW AN EYE AND THE PENTAGON BIRD IS READY!!!!



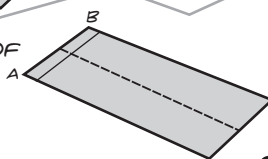
MAKE MANY COLOURFUL BIRDS. WEAVE THEM IN A THREAD TO MAKE A PRETTY WALL HANGING!



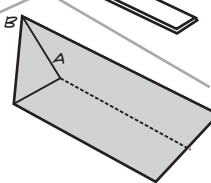
ENVELOPE TETRAHEDRON



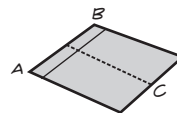
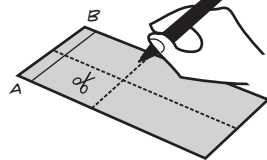
- 1 FOLD MIDLINE OF AN ENVELOPE ALONG ITS LENGTH.



- 2 FOLD POINT 'A' TO MIDLINE THROUGH 'B'.

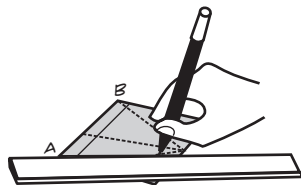


- 3 MARK THE LINE AND CUT---



---TO MAKE A RECTANGLE.

- 4 DRAW LINES CA AND CB---

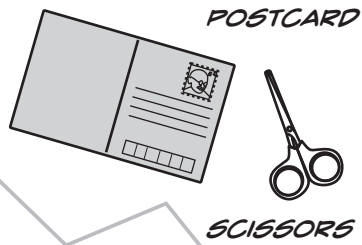


- 5 ---AND CREASE ALONG THEM.

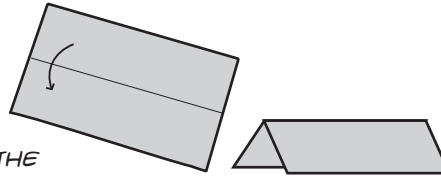


- 6 THEN OPEN THE MOUTH AND TAPE THE OPEN ENDS TO MAKE A BEAUTIFUL TETRAHEDRON!

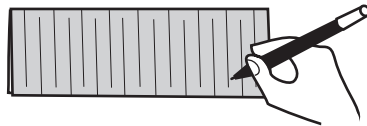




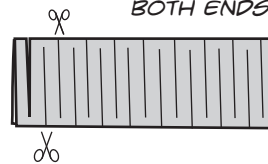
1 FOLD A POSTCARD
IN HALF ALONG ITS
LENGTH.



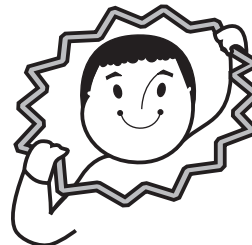
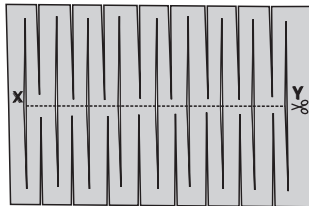
2 DRAW LINES ALONG THE
WIDTH AS SHOWN.



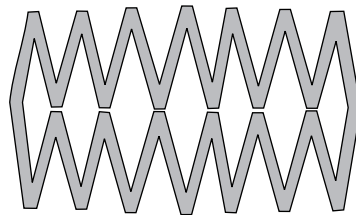
3 CUT ALONG THE
LINES FROM
BOTH ENDS.



4 OPEN POSTCARD AND
CUT FROM POINT X TO
Y TO GET A CLOSED
GARLAND.



5 YOU CAN SLIP THROUGH
THIS LARGE GARLAND!



SHIMMERING BIRD



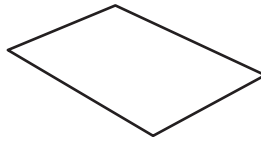
GLUE



THREAD



CARDSHEET
(15-CM X 9-CM)

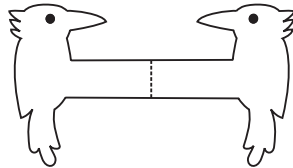


PIECE OF
REFILL(2-CM)

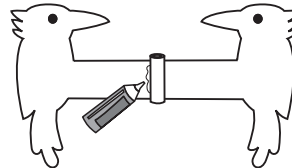


SCISSORS

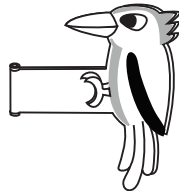
1 DRAW AND CUT THIS
DOUBLE BIRD ON
A THICK CARDSHEET.



2 STICK A 2-CM LONG EMPTY
BALL PEN REFILL PIECE
VERTICALLY IN THE MIDDLE.

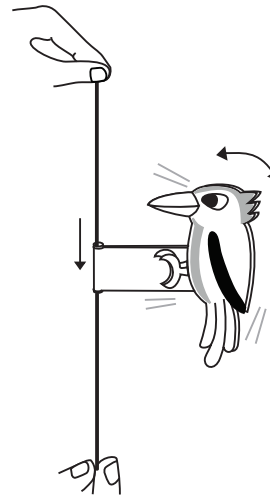


3 APPLY GLUE, DOUBLE
FOLD AND STICK THE BIRD.
COLOUR THE BIRD TO
MAKE IT LOOK PRETTY.



4 WEAVE A THREAD IN THE REFILL
AND TIE TWO BEADS ON THE ENDS
OF THE THREAD.

5 ON HOLDING THE THREAD TIGHT
THE BIRD WILL COME DOWN IN
SHORT JERKS!



- 1 CUT FOUR 'V'-SHAPED NOTCHES IN A FAT PLASTIC STRAW.

FAT STRAW

SCISSORS

ROBOTIC FINGER

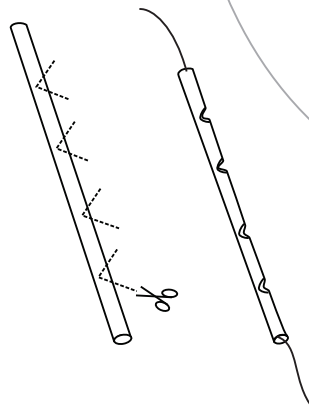


TAPE



THREAD

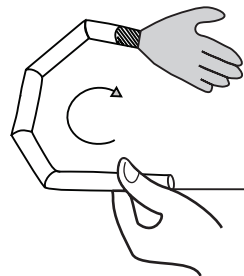
CARDSHEET HAND



- 2 WEAVE THIN THREAD THROUGH THE STRAW.

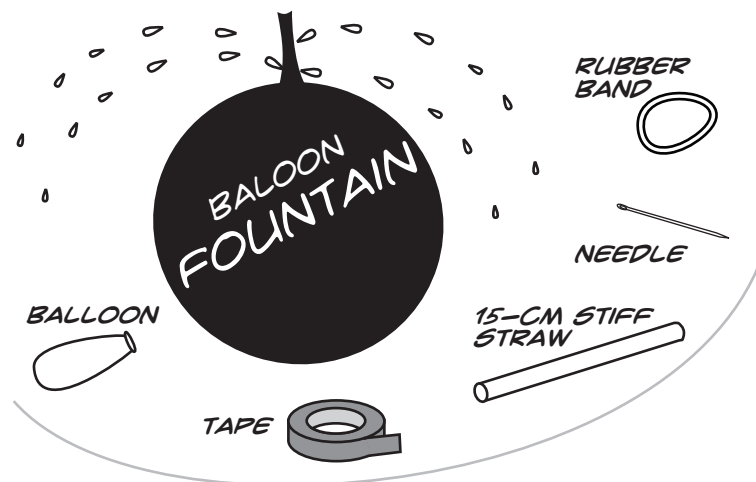
- 3 TAPE ONE END OF THE THREAD TO TOP END OF THE STRAW. TIE A LOOP AT THE OTHER END.

- 4 HOLD THE STRAW WITH ONE HAND AND PULL THE LOOP WITH THE OTHER TO MAKE THE ROBOTIC FINGER CURL. RELEASE BEAD TO STRAIGHTEN THE STRAW.



- 5 ATTACH A CARD HAND SO THAT YOU CAN WAVE A GOOD-BYE TO YOUR FRIENDS.

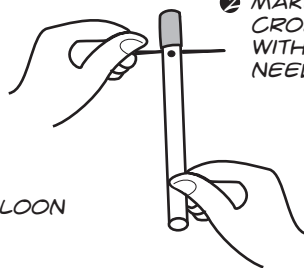




- 1 SEAL ONE END OF THE STIFF STRAW WITH TAPE.



- 2 MAKE FOUR CROSS HOLES WITH A LONG NEEDLE.

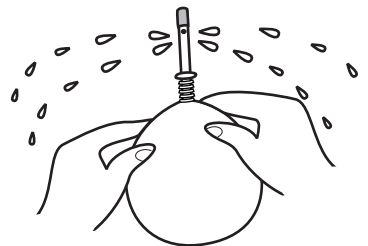


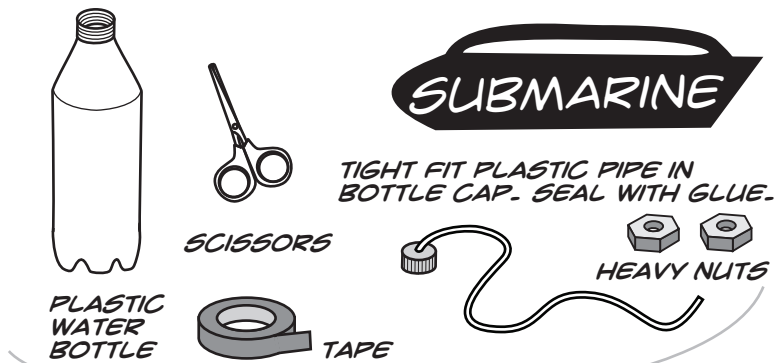
- 3 FILL THE BALLOON WITH WATER.



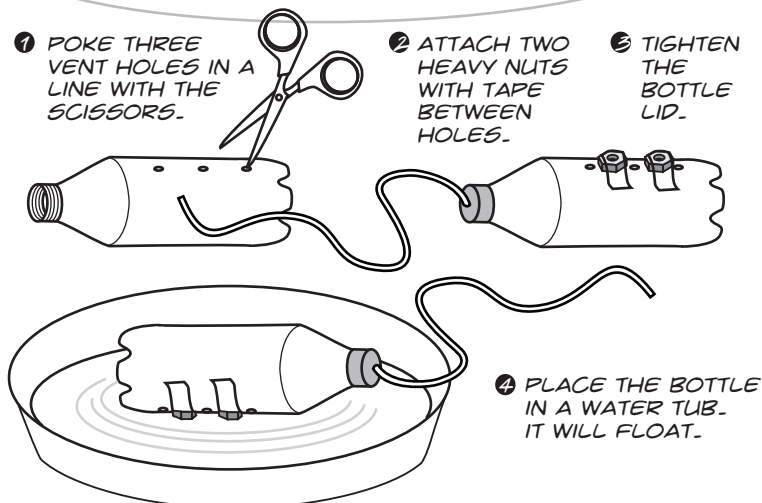
- 4 FIX STRAW TO THE BALLOON WITH A RUBBER BAND.

WATER WILL AUTOMATICALLY SQUIRT OUT LIKE A FOUNTAIN FROM THE STRAW.

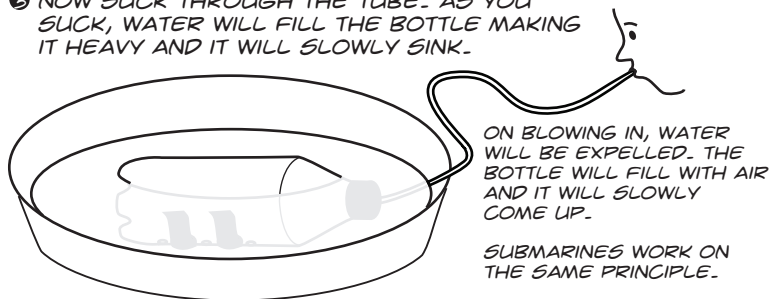


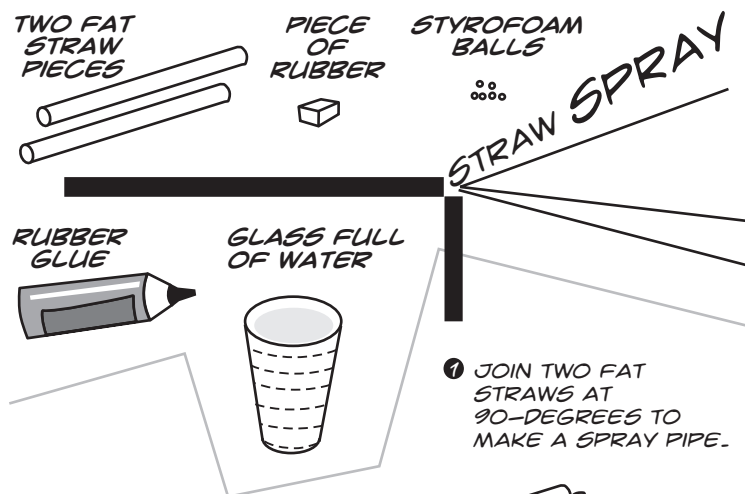


- 1 POKE THREE VENT HOLES IN A LINE WITH THE SCISSORS.
- 2 ATTACH TWO HEAVY NUTS WITH TAPE BETWEEN HOLES.
- 3 TIGHTEN THE BOTTLE LID.



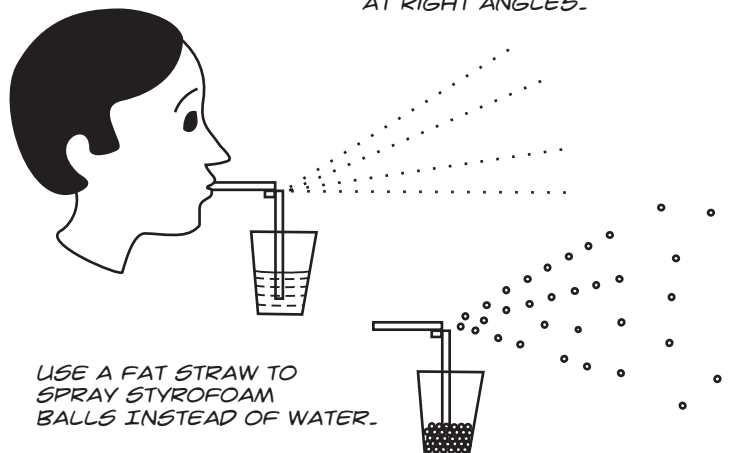
- 5 NOW SUCK THROUGH THE TUBE. AS YOU SUCK, WATER WILL FILL THE BOTTLE MAKING IT HEAVY AND IT WILL SLOWLY SINK.





3 DIP ONE END IN WATER AND BLOW. WATER SPRAY WILL COME OUT LIKE A MIST!

2 STICK A RUBBER PIECE FOR SUPPORT. THIS WILL KEEP THE STRAWS AT RIGHT ANGLES.



LEAF CAT

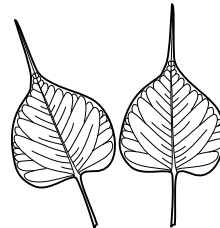
MEOW MEOW---



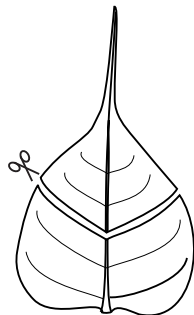
RUBBER GLUE



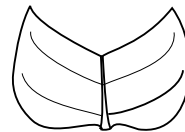
SCISSORS



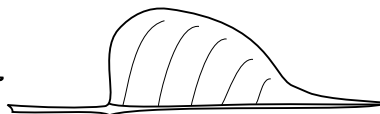
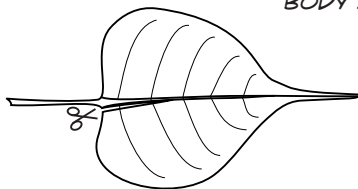
TWO PEEPAL
(FICUS RELIGIOSA)
LEAVES



- 1 MAKE TWO SLANT CUTS ON THE FIRST HEART SHAPED LEAF TO MAKE THE CAT'S FACE.



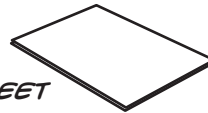
- 2 CUT THE SECOND LEAF ALONG THE MIDRIB. HALF THE LEAF ALONG WITH ITS STEM WILL MAKE THE CAT'S BODY AND THE TAIL.



- 3 STICK THE TWO PIECES TO MAKE THE LEAF CAT.



CARDSHEET



CUTTER



- 1 DRAW 18 ANIMALS ON A THICK CARD BOARD OR PLYWOOD. THEN CUT THEM WITH A CRAFT KNIFE OR A FRET SAW. YOU CAN STAND THESE ANIMALS INDIVIDUALLY TO MAKE A ZOO OR ELSE SNUG THEM TOGETHER INTO A JIGSAW.

The current slogan of "Buy More, Throw More" has created an environmental crisis. Our consumerist society produces lots of junk. Products are over packaged – sometimes with three-four layers of covering. Every day billions of plastic bottles, tetrapacks, cardboard cartons, wrappers and old Xerox sheets are thrown away. By collecting some of this junk children can help in cleaning up the earth. They can also make delightful toys out of this throwaway trash and in the process learn a lot of good science.

